7

Archaeal Porphyrins and Conscious/Unconscious Perception

Introduction

Actinidic archaea have been related to the pathogenesis of autism, seizure disorder, schizophrenia and chronic fatigue syndrome. An actinide dependent shadow biosphere of archaea and viroids in the above mentioned disease states is described. Actinidic archaea have a mevalonate pathway and are cholesterol catabolizing.[1-5] They can use cholesterol as a carbon and energy source. Archaeal cholesterol catabolism can generate porphyrins via the cholesterol ring oxidase generated pyruvate and GABA shunt pathway. Archaea can produce a secondary porphyria by inducing the enzyme heme oxygenase resulting in heme depletion and activation of the enzyme ALA synthase. Porphyrins have been related to autism, seizure disorder, schizophrenia and chronic fatigue syndrome. The role of archaeal porphyrins in regulation of cell functions and neuro-immuno-endocrine integration is discussed. The role of porphyrins in neural regulation and conscious/quantal perception as well as hemispheric dominance is elucidated.[1-5]

Materials and Methods

The following groups were included in the study: - autism, seizure disorder, schizophrenia and chronic fatigue syndrome. There were 10 patients in each group and each patient had an age and sex matched healthy control selected randomly from the general population. There were also 10 normal population samples with right, left and bihemispheric dominance. The blood samples were drawn in the fasting state before treatment was initiated. Plasma from fasting heparinised blood was used and the experimental protocol was as follows (I) Plasma+phosphate buffered saline, (II) same as I+cholesterol substrate, (III) same as II+rutile 0.1 mg/ml, (IV) same as II+ciprofloxacine and doxycycline each in a concentration of 1 mg/ml. Cholesterol substrate was prepared as described by Richmond. Aliquots were withdrawn at zero time immediately after mixing and after incubation at 37°C for 1 hour. The following estimations were carried out: - Cytochrome F420, free RNA, free DNA, polycyclic aromatic hydrocarbon, hydrogen peroxide, pyruvate, ammonia, glutamate, delta aminolevulinic acid, succinate, glycine and digoxin. Cytochrome F420 was estimated flourimetrically (excitation wavelength 420 nm and emission wavelength 520 nm). Polycyclic aromatic hydrocarbon was estimated by measuring hydrogen peroxide liberated by using glucose reagent. The study also involved estimating the following parameters in the patient population- digoxin, bile acid, hexokinase, porphyrins, pyruvate, glutamate, ammonia, acetyl CoA, acetyl choline, HMG CoA reductase, cytochrome C, blood ATP, ATP synthase, ERV RNA (endogenous retroviral RNA), H_2O_2 (hydrogen peroxide), NOX (NADPH oxidase), TNF alpha and heme oxygenase.[6-9] Informed consent of the subjects and the approval of the ethics committee were obtained for the study. The statistical analysis was done by ANOVA.

Results

Plasma of control subjects showed increased levels of the above mentioned parameters with after incubation for 1 hour and addition of cholesterol substrate resulted in still further significant increase in these parameters. The plasma of patients showed similar results but the extent of increase was more. The addition of antibiotics to the control plasma caused a decrease in all the parameters while addition of rutile increased their levels. The addition of antibiotics to the patient’s plasma caused a decrease in all the parameters while addition of rutile increased their levels but the extent of change was more in patient’s sera as compared to controls. The results are expressed in tables 1-6 as percentage change in the parameters after 1 hour incubation as compared to the values at zero time. There was upregulated archaeal porphyrin synthesis in the patient population which was archaeal in origin as indicated by actinide catalysis of the reactions. The cholesterol oxidase pathway generated pyruvate which entered the GABA shunt pathway. This resulted in synthesis of succinate and glycine which are substrates for ALA synthase.

The study showed the patient's blood and right hemispheric dominance had increased heme oxygenase activity and porphyrins. The hexokinase activity was high. The pyruvate, glutamate and ammonia levels were elevated indicating blockade of PDH activity, and operation of the GABA shunt pathway. The acetyl CoA levels were low and acetyl choline was decreased. The cytoC levels were increased in the serum indicating mitochondrial dysfunction suggested by low blood ATP levels. This was indicative of the Warburg's phenotype. There were increased NOX and TNF alpha levels indicating immune activation. The HMG CoA reductase activity was high indicating cholesterol synthesis. The bile acid levels were low indicating depletion of cytochrome P450. The normal population with right hemispheric dominance had values resembling the patient population with increased porphyrin synthesis. The normal population with left hemispheric dominance had low values with decreased porphyrin synthesis.

Section 1: Experimental Study

Table 1. *Effect of rutile and antibiotics on cytochrome F420 and PAH.*

Group	CYT F420 % (Increase with Rutile)		CYT F420 % (Decrease with Doxy+Cipro)		PAH % change (Increase with Rutile)		PAH % change (Decrease with Doxy+Cipro)	
	Mean	**+ SD**	**Mean**	**+ SD**	**Mean**	**+ SD**	**Mean**	**+ SD**
Normal	4.48	0.15	18.24	0.66	4.45	0.14	18.25	0.72
Schizo	23.24	2.01	58.72	7.08	23.01	1.69	59.49	4.30
Seizure	23.46	1.87	59.27	8.86	22.67	2.29	57.69	5.29
Autism	21.68	1.90	57.93	9.64	22.61	1.42	64.48	6.90
CFS	22.70	1.87	60.46	8.06	23.73	1.38	65.20	6.20
	F value 306.749 P value < 0.001		F value 130.054 P value < 0.001		F value 391.318 P value < 0.001		F value 257.996 P value < 0.001	

Table 2. *Effect of rutile and antibiotics on free RNA and DNA.*

Group	DNA % change (Increase with Rutile)		DNA % change (Decrease with Doxy+Cipro)		RNA % change (Increase with Rutile)		RNA % change (Decrease with Doxy+Cipro)	
	Mean	**+ SD**	**Mean**	**+ SD**	**Mean**	**+ SD**	**Mean**	**+ SD**
Normal	4.37	0.15	18.39	0.38	4.37	0.13	18.38	0.48
Schizo	23.28	1.70	61.41	3.36	23.59	1.83	65.69	3.94
Seizure	23.40	1.51	63.68	4.66	23.08	1.87	65.09	3.48
Autism	22.12	2.44	63.69	5.14	23.33	1.35	66.83	3.27
CFS	22.29	2.05	58.70	7.34	22.29	2.05	67.03	5.97
	F value 337.577 P value < 0.001		F value 356.621 P value < 0.001		F value 427.828 P value < 0.001		F value 654.453 P value < 0.001	

Table 3. *Effect of rutile and antibiotics on digoxin and delta aminolevulinic acid.*

Group	Digoxin (ng/ml) (Increase with Rutile)		Digoxin (ng/ml) (Decrease with Doxy+Cipro)		ALA % (Increase with Rutile)		ALA % (Decrease with Doxy+Cipro)	
	Mean	**+ SD**	**Mean**	**+ SD**	**Mean**	**+ SD**	**Mean**	**+ SD**
Normal	0.11	0.00	0.054	0.003	4.40	0.10	18.48	0.39
Schizo	0.55	0.06	0.219	0.043	22.52	1.90	66.39	4.20
Seizure	0.51	0.05	0.199	0.027	22.83	1.90	67.23	3.45
Autism	0.53	0.08	0.205	0.041	23.20	1.57	66.65	4.26
CFS	0.51	0.05	0.213	0.033	22.29	2.05	61.91	7.56
	F value 135.116 P value < 0.001		F value 71.706 P value < 0.001		F value 372.716 P value < 0.001		F value 556.411 P value < 0.001	

Table 4. *Effect of rutile and antibiotics on succinate and glycine.*

Group	Succinate % (Increase with Rutile)		Succinate % (Decrease with Doxy+Cipro)		Glycine % change (Increase with Rutile)		Glycine % change (Decrease with Doxy+Cipro)	
	Mean	**+ SD**	**Mean**	**+ SD**	**Mean**	**+ SD**	**Mean**	**+ SD**
Normal	4.41	0.15	18.63	0.12	4.34	0.15	18.24	0.37
Schizo	22.76	2.20	67.63	3.52	22.79	2.20	64.26	6.02
Seizure	22.28	1.52	64.05	2.79	22.82	1.56	64.61	4.95
Autism	21.88	1.19	66.28	3.60	23.02	1.65	67.61	2.77
CFS	22.29	1.33	65.38	3.62	22.13	2.14	66.26	3.93
	F value 403.394 P value < 0.001		F value 680.284 P value < 0.001		F value 348.867 P value < 0.001		F value 364.999 P value < 0.001	

Table 5. *Effect of rutile and antibiotics on pyruvate and glutamate.*

Group	Pyruvate % change (Increase with Rutile)		Pyruvate % change (Decrease with Doxy+Cipro)		Glutamate (Increase with Rutile)		Glutamate (Decrease with Doxy+Cipro)	
	Mean	**+ SD**	**Mean**	**+ SD**	**Mean**	**+ SD**	**Mean**	**+ SD**
Normal	4.34	0.21	18.43	0.82	4.21	0.16	18.56	0.76
Schizo	20.99	1.46	61.23	9.73	23.01	2.61	65.87	5.27
Seizure	20.94	1.54	62.76	8.52	23.33	1.79	62.50	5.56
Autism	21.91	1.71	58.45	6.66	22.88	1.87	65.45	5.08
CFS	22.29	2.05	62.37	5.05	21.66	1.94	67.03	5.97
	F value 321.255 P value < 0.001		F value 115.242 P value < 0.001		F value 292.065 P value < 0.001		F value 317.966 P value < 0.001	

Table 6. *Effect of rutile and antibiotics on hydrogen peroxide and Ammonia.*

Group	H2O2 % (Increase with Rutile)		H2O2 % (Decrease with Doxy+Cipro)		Ammonia % (Increase with Rutile)		Ammonia % (Decrease with Doxy+Cipro)	
	Mean	**+ SD**	**Mean**	**+ SD**	**Mean**	**+ SD**	**Mean**	**+ SD**
Normal	4.43	0.19	18.13	0.63	4.40	0.10	18.48	0.39
Schizo	22.50	1.66	60.21	7.42	22.52	1.90	66.39	4.20
Seizure	23.81	1.19	61.08	7.38	22.83	1.90	67.23	3.45
Autism	23.52	1.49	63.24	7.36	23.20	1.57	66.65	4.26
CFS	23.29	1.67	60.52	5.38	22.29	2.05	61.91	7.56
	F value 380.721 P value < 0.001		F value 171.228 P value < 0.001		F value 372.716 P value < 0.001		F value 556.411 P value < 0.001	

Section 2: Patient Study

Table 1. *RBC Digoxin (ng/ml RBC Susp).*

Group	Mean	+ SD
NO/BHCD	0.58	0.07
RHCD	1.41	0.23
LHCD	0.18	0.05
Schizophrenia	1.38	0.26
Seizure	1.23	0.26
Autism	1.19	0.24
Chronic fatigue syndr	1.35	0.22
F value	60.288	
P value	< 0.001	

Table 2. *Cytochrome F 420.*

Group	**Mean**	**+ SD**
NO/BHCD	1.00	0.00
RHCD	4.00	0.00
LHCD	0.00	0.00
Schizophrenia	4.00	0.00
Seizure	4.00	0.00
Autism	4.00	0.00
Chronic fatigue syndr	4.00	0.00
F value	0.001	
P value	< 0.001	

Table 3. *HERV RNA (ug/ml).*

Group	**Mean**	**+ SD**
NO/BHCD	17.75	0.72
RHCD	55.17	5.85
LHCD	8.70	0.90
Schizophrenia	51.17	3.65
Seizure	50.04	3.91
Autism	52.87	7.04
Chronic fatigue syndr	48.54	5.97
F value	194.418	
P value	< 0.001	

Table 4. *H_2O_2 (umol/ml RBC).*

Group	**Mean**	**+ SD**
NO/BHCD	177.43	6.71
RHCD	278.29	7.74
LHCD	111.63	5.40
Schizophrenia	274.88	8.73
Seizure	278.90	11.20
Autism	274.52	9.29
Chronic fatigue syndr	277.50	7.51
F value	713.569	
P value	< 0.001	

Table 5. *NOX (OD diff/hr/mgpro).*

Group	Mean	± SD
NO/BHCD	0.012	0.001
RHCD	0.036	0.008
LHCD	0.007	0.001
Schizophrenia	0.036	0.009
Seizure	0.038	0.007
Autism	0.036	0.006
Chronic fatigue syndr	0.040	0.006
F value	44.896	
P value	< 0.001	

Table 6. *TNF ALP (pg/ml).*

Group	Mean	± SD
NO/BHCD	17.94	0.59
RHCD	78.63	5.08
LHCD	9.29	0.81
Schizophrenia	78.23	7.13
Seizure	79.28	4.55
Autism	76.71	5.25
Chronic fatigue syndr	80.34	4.73
F value	427.654	
P value	< 0.001	

Table 7. *ALA (umol24).*

Group	Mean	± SD
NO/BHCD	15.44	0.50
RHCD	63.50	6.95
LHCD	3.86	0.26
Schizophrenia	66.16	6.51
Seizure	68.28	6.02
Autism	68.16	4.92
Chronic fatigue syndr	66.68	4.14
F value	295.467	
P value	< 0.001	

Table 8. *PBG (umol24).*

Group	Mean	± SD
NO/BHCD	20.82	1.19
RHCD	42.20	8.50
LHCD	12.11	1.34
Schizophrenia	42.50	3.23
Seizure	46.54	4.55
Autism	42.04	2.38
Chronic fatigue syndr	48.70	3.35
F value	183.296	
P value	< 0.001	

Table 9. *UROPORPHYRIN (nmol24).*

Group	Mean	± SD
NO/BHCD	50.18	3.54
RHCD	250.28	23.43
LHCD	9.51	1.19
Schizophrenia	267.81	64.05
Seizure	290.44	57.65
Autism	318.84	82.90
Chronic fatigue syndr	287.09	15.63
F value	160.533	
P value	< 0.001	

Table 10. *COPROPORPHYRIN (nmol/24).*

Group	Mean	± SD
NO/BHCD	137.94	4.75
RHCD	389.01	54.11
LHCD	64.33	13.09
Schizophrenia	401.49	50.73
Seizure	436.71	52.95
Autism	423.29	47.57
Chronic fatigue syndr	442.85	49.61
F value	279.759	
P value	< 0.001	

Table 11. *PROTOPORPHYRIN (Ab unit).*

Group	**Mean**	**± SD**
NO/BHCD	10.35	0.38
RHCD	42.46	6.36
LHCD	2.64	0.42
Schizophrenia	44.30	2.66
Seizure	49.59	1.70
Autism	47.50	2.87
Chronic fatigue syndr	50.36	3.49
F value	424.198	
P value	< 0.001	

Table 12. *HEME (uM).*

Group	**Mean**	**± SD**
NO/BHCD	30.27	0.81
RHCD	12.47	2.82
LHCD	50.55	1.07
Schizophrenia	12.82	2.40
Seizure	13.03	0.70
Autism	12.37	2.09
Chronic fatigue syndr	12.01	1.53
F value	1472.05	
P value	< 0.001	

Table 13. *Bilirubin (mg/dl).*

Group	**Mean**	**± SD**
NO/BHCD	0.55	0.02
RHCD	1.70	0.20
LHCD	0.21	0.00
Schizophrenia	1.74	0.08
Seizure	1.84	0.07
Autism	1.83	0.16
Chronic fatigue syndr	1.84	0.07
F value	370.517	
P value	< 0.001	

Table 14. Biliverdin (Ab unit).

Group	Mean	± SD
NO/BHCD	0.030	0.001
RHCD	0.067	0.011
LHCD	0.017	0.001
Schizophrenia	0.073	0.013
Seizure	0.070	0.015
Autism	0.072	0.014
Chronic fatigue syndr	0.073	0.011
F value	59.963	
P value	< 0.001	

Table 15. ATP Synthase (umol/gHb).

Group	Mean	± SD
NO/BHCD	0.36	0.13
RHCD	2.73	0.94
LHCD	0.09	0.01
Schizophrenia	2.66	0.58
Seizure	3.09	0.65
Autism	2.67	0.80
Chronic fatigue syndr	3.15	0.46
F value	54.754	
P value	< 0.001	

Table 16. SE ATP (umol/dl).

Group	Mean	± SD
NO/BHCD	0.42	0.11
RHCD	2.24	0.44
LHCD	0.02	0.01
Schizophrenia	1.26	0.19
Seizure	1.66	0.56
Autism	2.03	0.12
Chronic fatigue syndr	1.51	0.38
F value	67.588	
P value	< 0.001	

Table 17. *Cyto C (ng/ml).*

Group	Mean	± SD
NO/BHCD	2.79	0.28
RHCD	12.39	1.23
LHCD	1.21	0.38
Schizophrenia	11.58	0.90
Seizure	12.06	1.09
Autism	12.48	0.79
Chronic fatigue syndr	12.23	0.94
F value	445.772	
P value	< 0.001	

Table 18. *Lactate (mg/dl).*

Group	Mean	± SD
NO/BHCD	7.38	0.31
RHCD	25.99	8.10
LHCD	2.75	0.41
Schizophrenia	22.07	1.06
Seizure	21.78	0.58
Autism	21.95	0.65
Chronic fatigue syndr	23.66	1.64
F value	162.945	
P value	< 0.001	

Table 19. *Pyruvate (umol/l).*

Group	Mean	± SD
NO/BHCD	40.51	1.42
RHCD	100.51	12.32
LHCD	23.79	2.51
Schizophrenia	96.54	9.96
Seizure	90.46	8.30
Autism	92.71	8.43
Chronic fatigue syndr	94.36	8.06
F value	154.701	
P value	< 0.001	

Table 20. *RBC Hexokinase (ug glu phos/hr/mgpro).*

Group	Mean	+ SD
NO/BHCD	1.66	0.45
RHCD	5.46	2.83
LHCD	0.68	0.23
Schizophrenia	7.69	3.40
Seizure	6.29	1.73
Autism	6.95	2.02
Chronic fatigue syndr	8.53	2.64
F value	18.187	
P value	< 0.001	

Table 21. *ACOA (mg/d).*

Group	Mean	+ SD
NO/BHCD	8.75	0.38
RHCD	2.51	0.36
LHCD	16.49	0.89
Schizophrenia	2.51	0.57
Seizure	2.15	0.22
Autism	2.42	0.41
Chronic fatigue syndr	2.04	0.10
F value	1871.04	
P value	< 0.001	

Table 22. *ACH (ug/ml).*

Group	Mean	+ SD
NO/BHCD	75.11	2.96
RHCD	38.57	7.03
LHCD	91.98	2.89
Schizophrenia	48.52	6.28
Seizure	33.27	5.99
Autism	50.61	6.32
Chronic fatigue syndr	37.95	8.82
F value	116.901	
P value	< 0.001	

Table 23. *Glutamate (mg/dl).*

Group	Mean	± SD
NO/BHCD	0.65	0.03
RHCD	3.19	0.32
LHCD	0.16	0.02
Schizophrenia	3.41	0.41
Seizure	3.67	0.38
Autism	3.30	0.32
Chronic fatigue syndr	3.33	0.25
F value	200.702	
P value	< 0.001	

Table 24. *Se. Ammonia (ug/dl).*

Group	Mean	± SD
NO/BHCD	50.60	1.42
RHCD	93.43	4.85
LHCD	23.92	3.38
Schizophrenia	94.72	3.28
Seizure	95.61	7.88
Autism	94.01	5.00
Chronic fatigue syndr	93.42	5.34
F value	61.645	
P value	< 0.001	

Table 25. *HMG Co A (HMG CoA/MEV).*

Group	Mean	± SD
NO/BHCD	1.70	0.07
RHCD	1.16	0.10
LHCD	2.21	0.39
Schizophrenia	1.11	0.08
Seizure	1.14	0.07
Autism	1.12	0.06
Chronic fatigue syndr	1.01	0.09
F value	159.963	
P value	< 0.001	

Table 26. *Bile Acid (mg/ml).*

Group	Mean	± SD
NO/BHCD	79.99	3.36
RHCD	25.68	7.04
LHCD	140.40	10.32
Schizophrenia	22.45	5.57
Seizure	22.98	5.19
Autism	23.16	5.78
Chronic fatigue syndr	23.87	4.00
F value	635.306	
P value	< 0.001	

Abbreviations

NO/BHCD: Normal/Bi-hemispheric chemical dominance

RHCD: Right hemispheric chemical dominance

LHCD: Left hemispheric chemical dominance

Discussion

There was increase in cytochrome F420 indicating archaeal growth. The archaea can synthesize and use cholesterol as a carbon and energy source.[2,10] The archaeal origin of the enzyme activities was indicated by antibiotic induced suppression. The study indicates the presence of actinide based archaea with an alternate actinide based enzymes or metalloenzymes in the system as indicated by rutile induced increase in enzyme activities.[11] The archaeal beta hydroxyl steroid dehydrogenase activity indicating digoxin synthesis.[12] The archaeal cholesterol oxidase activity was increased resulting in generation of pyruvate and hydrogen peroxide.[10] The pyruvate gets converted to glutamate and ammonia by the GABA shunt pathway. The pyruvate is converted to glutamate by serum glutamate pyruvate transaminase. The glutamate gets acted upon by glutamate dehydrogenase to generate alpha ketoglutarate and ammonia. Alanine is most commonly produced by the reductive amination of pyruvate via alanine transaminase. This reversible reaction involves the interconversion of alanine and pyruvate, coupled to the interconversion of alpha-ketoglutarate (2-oxoglutarate) and glutamate. Alanine can contribute to glycine. Glutamate is acted upon by Glutamic acid decarboxylase to generate GABA. GABA is converted to succinic semialdehyde by GABA transaminase. Succinic semialdehyde is converted to succinic acid by succinic semialdehyde dehydrogenase. Glycine combines with succinyl CoA to generate delta aminolevulinic acid catalysed by the enzyme ALA synthase. There was upregulated archaeal porphyrin synthesis in the patient population which was archaeal in origin as indicated by actinide catalysis of the reactions. The cholesterol oxidase pathway generated pyruvate which entered the GABA shunt pathway. This resulted in synthesis of succinate and glycine which are substrates for ALA synthase. The archaea can undergo magnetite and calcium carbonate mineralization and can exist as calcified nanoforms.[13]

The possibility of Warburg phenotype induced by actinide based primitive organism like archaea with a mevalonate pathway and cholesterol catabolism was considered in this paper. The Warburg phenotype results in inhibition of pyruvate dehydrogenase and the TCA cycle. The pyruvate enters the GABA shunt pathway where it is converted to succinyl CoA. The glycolytic pathway is upregulated and the glycolytic metabolite phosphoglycerate is converted to serine and glycine. Glycine and succinyl CoA are the substrates for ALA synthesis. The archaea induces the enzyme heme oxygenase. Heme oxygenase converts heme to bilirubin and biliverdin. This depletes heme from the system and results in upregulation of ALA synthase activity resulting in porphyria. Heme inhibits HIF alpha. The heme depletion results in upregulation of HIF alpha activity and further strengthening of the Warburg phenotype. The porphyrin self oxidation result in redox stress which activates HIF alpha and generate the Warburg phenotype. The Warburg phenotype results in channeling acetyl CoA for cholesterol synthesis as the TCA cycle and mitochondrial oxidative phosphorylation are blocked. The archaea uses cholesterol as an energy substrate. Porphyrin and ALA inhibits sodium potassium ATPase. This increases cholesterol synthesis by acting upon intracellular SREBP. The cholesterol is metabolized to pyruvate and then the GABA shunt pathway for ultimate use in porphyrin synthesis. The porphyrins can self organize and self replicate into macromolecular arrays. The porphyrin arrays behave like an autonomous organism and can have intramolecular electron transport generating ATP. The porphyrin macroarrays can store information and can have quantal perception. The porphyrin macroarrays serves the purpose of archaeal energetics and sensory perception. The Warburg phenotype can contribute to neuropsychiatric disorders.

The role of archaeal porphyrins in regulation of cell functions and neuro-immuno-endocrine integration is discussed. Protoporphyrine binds to the peripheral benzodiazepine receptor regulating steroid and digoxin synthesis. Increased porphyrin metabolites can contribute to hyperdigoxinemia. Digoxin can modulate the neuro-immuno-endocrine system. Porphyrins can combine with membranes modulating membrane function. Porphyrins can combine with proteins oxidizing their tyrosine, tryptophan, cysteine and histidine residues producing crosslinking and altering protein conformation and function. Porphyrins can complex with DNA and RNA modulating their function. Porphyrin interpolating with DNA can alter transcription and generate HERV expression. Heme deficiency can also result in disease states. Heme deficiency results in deficiency of heme enzymes. There is deficiency of cytochrome C oxidase and mitochondrial dysfunction. The glutathione peroxidase is dysfunctional and the glutathione system of free radical scavenging does not function. The cytochrome P450 enzymes involved in steroid and bile acid synthesis have reduced activity leading to steroid- cortisol and sex hormones as well as bile acid deficiency states. The heme deficiency results in dysfunction of nitric oxide synthase, heme oxygenase and cysthathione beta synthase resulting in lack of gasotransmitters regulating the vascular system and NMDA receptor-NO, CO and H_2S. Heme has got cytoprotective, neuroprotective, anti-inflammatory and antiproliferative effects. Heme is also involved in the stress response. Heme deficiency leads to autism, seizure disorder, schizophrenia and chronic fatigue syndrome. Bile acids can bind to olfactory receptors and modulate limbic lobe function. Bile acids are involved in group and social cognition. Bile acid deficiency can lead to autism and schizophrenia. Bile acids are neuroprotective and its deficiency can contribute to autism, seizure disorder, schizophrenia and chronic fatigue syndrome. Mitochondrial dysfunction has been related to autism, seizure disorder, schizophrenia and chronic fatigue syndrome. NO, CO and H_2S deficiency can contribute to hypoglutamatergic state in schizophrenia and autism. As serine and glycine are utilized for porphyrin synthesis, they are not available for positive modulation of the NMDA receptor. This can contribute to NMDA receptor dysfunction in schizophrenia and autism.[3-5]

The porphyrins can undergo photo-oxidation and autooxidation generating free radicals. The archaeal porphyrins can produce free radical injury. Free radicals produce NFKB activation, open the mitochondrial PT pore resulting in cell death, produce oncogene activation, activate NMDA receptor and GAD enzyme regulating neurotransmission and generates the Warburg phenotypes activating glycolysis and inhibiting TCA cycle/oxphos. The porphyrins can complex and intercalate with the cell membrane producing sodium potassium ATPase inhibition adding on to digoxin mediated inhibition. Porphyrins can complex with proteins and nucleic acid producing biophoton emission. Porphyrins complexing with proteins can modulate protein structure and function. Porphyrins complexing with DNA and RNA can modulate transcription and translation. The porphyrin especially protoporphyrins can bind to peripheral benzodiazepine receptors in the mitochondria and modulate its function, mitochondrial cholesterol transport and steroidogenesis. Peripheral benzodiazepine receptor modulation by protoporphyrins can regulate cell death, cell proliferation, immunity and neural functions. The porphyrin photo-oxidation generates free radicals which can modulate enzyme function. Redox stress modulated enzymes include pyruvate dehydrogenase, nitric oxide synthase, cystathione beta synthase and heme oxygenase. Free radicals can modulate mitochondrial PT pore function. Free radicals can modulate cell membrane function and inhibit sodium potassium ATPase activity. Thus the porphyrins are key regulatory molecules modulating all aspects of cell function.[3-5] There was an increase in free RNA indicating self replicating RNA viroids and free DNA indicating generation of viroid complementary DNA strands by archaeal reverse transcriptase activity. The actinides and porphyrins modulate RNA folding and catalyse its ribozymal action. Digoxin can cut and paste the viroidal strands by modulating RNA splicing generating RNA viroidal diversity. The viroids are evolutionarily escaped archaeal group I introns which have retrotransposition and self splicing qualities. Archaeal pyruvate producing histone deacetylase inhibition and porphyrins intercalating with DNA can produce endogenous retroviral (HERV) reverse transcriptase and integrase expression. This can integrate the RNA viroidal complementary DNA into the noncoding region of eukaryotic non coding DNA using HERV integrase as has been described for borna and ebola viruses. The archaea and viroids can also induce cellular porphyrin synthesis. Bacterial and viral infections can precipitate porphyria. Thus porphyrins can regulate genomic function. HERV expression has been related to autism, seizure disorder, schizophrenia and chronic fatigue syndrome. Redox stress can contribute to autism, seizure disorder, schizophrenia and chronic fatigue syndrome.[14,15]

The archaea and viroids can regulate the nervous system including the NMDA/GABA thalamocorticothalamic pathway mediating conscious perception. Porphyrin photo-oxidation can generate free radicals which can modulate NMDA transmission. Free radicals can increase NMDA transmission. Free radicals can induce GAD and increase GABA synthesis. ALA blocks GABA transmission and upregulates NMDA. Protoporphyrins bind to GABA receptor and promote GABA transmission. Thus porphyrins can modulate the thalamocorticothalamic pathway of conscious perception. The dipolar porphyrins, PAH and archaeal magnetite in the setting of digoxin induced sodium potassium ATPase inhibition can produce a pumped phonon system mediated Frohlich model superconducting state inducing quantal perception with nanoarchaeal sensed gravity producing the orchestrated reduction of the quantal possibilities to the macroscopic world. ALA can produce sodium potassium ATPase inhibition resulting in a pumped phonon system mediated quantal state involving dipolar porphyrins. Porphyrin molecules have a wave particle existence and can bridge the dividing line between quantal state and particulate state. Thus the porphyrins can mediate conscious and quantal perception. Porphyrins binding to proteins, nucleic acids and cell membranes can produce biophoton emission. Porphyrins by autooxidation can generate biophotons and are involved in quantal perception. Biophotons can mediate quantal perception. Cellular porphyrins photo-oxidation are involved in sensing of earth magnetic fields and low level biomagnetic fields. Thus prophyrins can mediate extrasensory perception. The porphyrins can modulate hemispheric dominance. There is increased porphyrin synthesis and RHCD and decreased porphyrin synthesis in LHCD. The increase in archaeal porphyrins can contribute to the pathogenesis of schizophrenia and autism. Porphyria can lead to psychiatric disorders and seizures. Altered porphyrin metabolism has been described in autism. Porphyrin by modulating conscious and quantal perception is involved in the pathogenesis of schizophrenia and autism. Protoporphyrins block acetyl choline transmission producing a vagal neuropathy with sympathetic overactivity. Vagal neuropathy results in immune activation, vasospasm and vascular disease. A vagal neuropathy underlines functional neuropsychiatric disorders. Porphyrin induced increased NMDA transmission and free radical injury can contribute to neuronal degeneration. Free radicals can produce mitochondrial PT pore dysfunction. This can lead to cytoC leak and activation of the caspase cascade leading to apoptosis and cell death. Altered porphyrin metabolism has been described in autism, seizure disorder, schizophrenia and chronic fatigue syndrome. The increased porphyrin photo-oxidation generated free radicals mediated NMDA transmission can also contribute to epileptogenesis. The protoporphyrins binding to mitochondrial benzodiazepine receptors can regulate brain function and cell death.[3,4,16]

The porphyrin photo-oxidation can generate free radicals which can activate NFKB. This can produce immune activation and cytokine mediated injury. Immune activation has been related to autism, seizure disorder, schizophrenia and chronic fatigue syndrome. The increase in archaeal porphyrins can lead to immune activation crucial in the pathogenesis of functional neuropsychiatric disorders. The protoporphyrins binding to mitochondrial benzodiazepine receptors can modulate immune function. Porphyrins can combine with proteins oxidizing their tyrosine, tryptophan, cysteine and histidine residues producing crosslinking and altering protein conformation and function. Porphyrins can complex with DNA and RNA modulating their structure. Porphyrin complexed with proteins and nucleic acids are antigenic and can lead onto autoimmune pathology documented in autism, seizure disorder, schizophrenia and chronic fatigue syndrome.[3,4] The protoporphyrins binding to mitochondrial benzodiazepine receptors can modulate mitochondrial steroidogenesis and metabolism. Sex steroids can modulate brain neurotransmission and contribute to the pathogenesis of autism, seizure disorder, schizophrenia and chronic fatigue syndrome.[3,4] The porphyrins in the blood can combine with bacteria and viruses and the photo-oxidation generated free radicals can kill them. The archaeal porphyrins can modulate bacterial and viral infections. The archaeal porphyrins are regulatory molecules keeping other prokaryotes and viruses on check. Borna and herpes viruses has been related to autism, seizure disorder, schizophrenia and chronic fatigue syndrome.[3,4] Thus the archaeal porphyrins can contribute to the pathogenesis of autism, seizure disorder, schizophrenia and chronic fatigue syndrome. Archaeal porphyrin synthesis is crucial in the pathogenesis of these disorders. Porphyrins may serve as regulatory molecules modulating immune, neural, endocrine, metabolic and genetic systems. The porphyrins photo-oxidation generated free radicals can produce immune activation, produce cell death, activate cell proliferation, produce insulin resistance and modulate conscious/quantal perception. The archaeal porphyrins functions as key regulatory molecules with mitochondrial benzodiazepine receptors playing an important role.[3,4]

Porphyrins also have evolutionary significance since porphyria is related to Scythian races and contributes to the behavioural and intellectual characteristics of this group of population. Porphyrins can intercalate into DNA and produce HERV expression. HERV RNA can get converted to DNA by reverse transcriptase which can get integrated into DNA by integrase. This tends to increase the length of the non coding region of the DNA. The increase in non coding region of the DNA is involved in primate and human evolution. Thus, increased rates of porphyrin synthesis would correlate with increase in non coding DNA length. The alteration in the length of the non coding region of the DNA contributes to the dynamic nature of the genome. Thus genetic and acquired porphyrias can lead to alteration in the non coding region of the genome. The alteration of the length of the non coding region of the DNA contributes to the racial and individual differences in populations. An increased length of non coding region as well as increased porphyrin synthesis leads to increased cognitive and creative neuronal function. Porphyrins are involved in quantal perception and regulation of the thalamocorticothalamic pathway of conscious perception. Thus genetic and acquired porphyrias contribute to higher cognitive and creative capacity of certain races. Porphyrias are common among Eurasian Scythian races who have assumed leadership roles in communities and groups. Porphyrins have contributed to human and primate evolution. There is high incidence of autism, seizure disorder, schizophrenia and chronic fatigue syndrome in Scythian races and most of our patient population belonged to this group.[3,4]

The dipolar porphyrins, PAH and archaeal magnetite in the setting of digoxin induced sodium potassium ATPase inhibition can produce a pumped phonon system mediated Frohlich model superconducting state inducing quantal perception with nanoarchaeal sensed gravity producing the orchestrated reduction of the quantal possibilities to the macroscopic world. ALA can produce sodium potassium ATPase inhibition resulting in a pumped phonon system mediated quantal state involving dipolar porphyrins. Porphyrins by autooxidation can generate biophotons and are involved in quantal perception. Biophotons can mediate quantal perception. Cellular porphyrins photo-oxidation are involved in sensing of earth magnetic fields and low level biomagnetic fields. Porphyrins can thus contribute to quantal perception. Low level electromagnetic fields and light can induce porphyrin synthesis. Low level EMF can produce ferrochelatase inhibition as well as heme oxygenase induction contributing to heme depletion, ALA synthase induction and increased porphyrin synthesis. Light also induces ALA synthase and porphyrin synthesis. The increased porphyrin synthesized can contribute to increased quantal perception and can modulate conscious perception. The porphyrin induced biophotons and quantal fields can modulate the source from which low level

EMF and photic fields were generated. Thus the porphyrin generated by extraneous low level EMF and photic fields can interact with the source of low level EMF and photic fields modulating it. Thus porphyrins can serve as a bridge between the human brain and the source of low level EMF and photic fields. This serves as a mode of communication between the human brain and EMF storage devices like internet. The porphyrins can also serve as the source of communication with the environment. Environmental EMF and chemicals produce heme oxygenase induction and heme depletion increasing porphyrin synthesis, quantal perception and two-way communication. Thus induction of porphyrin synthesis can serve as a mechanism of communication between human brain and the environment by extrasensory perception. Thus porphyrin mediated extrasensory perception can contribute to the pathogenesis of autism, seizure disorder, schizophrenia and chronic fatigue syndrome as well as hemispheric dominance. A porphyrin metabolic defect may underlie autism, seizure disorder, schizophrenia and chronic fatigue syndrome. Porphyrins are the principal molecules modulating quantal and conscious perception as well as hemispheric dominance.

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